In the Claims:

1. (Currently Amended) An electrical transducer using a two-wire process comprising:
an analog sensor that detects a quantity to be measured;
an analog end stage which is connected downstream of the sensor at the output end of the transducer;
a processor circuit; and
wherein the processor circuit is not connected serially between the sensor and the analog end stage so that an analog measurement signal transmission path is realized, the analog end stage converting an output signal of the sensor into an impressed output current with a magnitude which is a measure of the quantity to be measured and is fixed within a range of about 0 to 20 mA, the electronic transducer being controlled by the processor circuit, wherein during normal operation of the electrical transducer, the processor circuit is shifted temporarily from an awake mode into a sleep mode in which the processor circuit is inactive, the analog measurement signal transmission path includes an analog scaling unit, the output signal of the sensor and at least one analog setting value are supplied to the analog scaling unit, and the output signal of the analog scaling unit is supplied to the analog end stage.

2. (Previously Presented) The electrical transducer of claim 1, wherein the analog scaling unit is an analog arithmetic circuit to which as the at least one analog setting value, a DC voltage signal or a direct current signal is delivered.

3. (Previously Presented) The electrical transducer of claim 2, wherein at least one active integrator, as an actuator for at least one DC voltage signal is connected to the processor circuit and to the analog scaling unit.

4. (Previously presented) The electrical transducer of claim 3, wherein the at least one active integrator is a component of a control circuit within the processor circuit.

5. (Original) The electrical transducer of claim 2, wherein the analog arithmetic circuit comprises at least one analog multiplier.

6. (Original) The electrical transducer of claim 5, wherein the analog multiplier is a single quadrant multiplier.

7. (Previously presented) The electrical transducer of claim 5, wherein the analog arithmetic circuit further comprises at least one subtractor and at least one adder.

8. (Original) The electrical transducer of claim 5, wherein the analog arithmetic circuit comprises a plurality of transistors and a plurality of operational amplifiers.

9. (Original) The electrical transducer of claim 1, further comprising a power source that produces a non-zero output current.

10. (Previously presented) The electrical transducer of claim 6, wherein an adder is connected to the input of a single quadrant multiplier, and a subtractor and an adder are connected to the output of the single quadrant amplifier.

11. (Previously presented) The electrical transducer of claim 1, further comprising an attenuator, having an adjustable time constant, connected between the analog scaling unit and the analog end stage.

12. (Previously presented) The electrical transducer of claim 11, wherein the attenuator comprises a plurality of different RC elements which are selectively connectable via the processor circuit.

13. (Previously presented) The electrical transducer of claim 11, wherein an analog error at the output of the attenuator is compensated by a control circuit.

14. (Previously presented) The electrical transducer of claim 1, further comprising three power supply terminals, one of which is connected to a detector means so that when a predetermined power supply voltage is applied to said one of the power supply terminals, the transducer automatically switches to three-wire operation.

15. (Original) The electrical transducer of claim 14, wherein the detector means is connected to the processor circuit, and the processor circuit shifts permanently into the awake mode during three-wire operation.

16. (Currently Amended) A method of producing an indication of a measured value with an electrical transducer via an output current which is proportional to the measured value, the transducer comprising a sensor, an analog end stage which is connected downstream of the sensor at the output end of the transducer, an electronic circuit which is connected downstream of the sensor, and a processor circuit which is not connected serially between the sensor and the analog end stage so that an analog measurement signal transmission path is realized, the electronic circuit converting an output signal of the sensor into an impressed output current with a level corresponding to the measured value and is fixed within a range of about 0 to 20 mA, the electrical transducer being programmed using the processor circuit, wherein during normal operation of the transducer, the processor circuit is shifted temporarily from an awake mode into a sleep mode in which the processor circuit is inactive, the output signal of the sensor is supplied to an analog scaling unit, at least one analog setting value is supplied to the analog scaling unit, and the output signal of the analog scaling unit is supplied to the electronic circuit.

17. (Previously Presented) The electrical transducer of claim 2, wherein at least one active integrator, as an actuator for at least one direct current signal, is connected to the processor circuit and to the analog scaling unit.

18. (New) The electrical transducer of claim 16, wherein the duration of the sleep mode of the processor circuit is much longer than the duration of the awake mode.

19. (New) The electrical transducer of claim 1, wherein the duration of the sleep mode of the processor circuit is much longer than the duration of the awake mode.

20. (New) The electrical transducer of claim 1, wherein the impressed output current is fixed within a range of about 4 to 20 mA.

21. (New) The electrical transducer of claim 16, wherein the impressed output current is fixed within a range of about 4 to 20 mA.